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09/686,370	10/12/2000	Masashi Saito	07553.0010	4800

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EXAMINER

KACKAR, RAM N

ART UNIT PAPER NUMBER

1763

DATE MAILED: 01/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/686,370

Applicant(s)

SAITO ET AL.

Examiner

Ram N Kackar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-11,14-23,25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-11,14-23,25 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this instance primary and circulating gas supply systems are claimed independent and later on in the same claim, connected with each other via piping. Clearly, if they are connected they cannot be independent. For the purpose of examination in this office action, consideration has been given to the claim of primary and circulating systems being connected and the notion of them being independent is ignored.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3-6, 8-11, 14-23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara (JP 09251981 A) in view of Umotoy et al (US 6086677) and Moslehi et al (US 5453124).

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Kurihara et al disclose independent gas flow systems comprising, primary gas flow (Fig 5, 111 or 112), circulating gas flow (107), means of controlling conductance and in turn flow (Fig 5 112 and 108), both through plurality of holes (Fig 5 302), a vacuum apparatus (303 and 106) and constancy of density and hole radius for primary gas supply constant over the surface where holes exist (Fig 5-302), buffer space above primary and circulating holes (Fig 5- 302), means for filtering circulating gas (Fig 1- 113) and primary and circulating gas supply systems connected (Fig 8) as claimed in claim 25.

Kurihara et al however do not expressly disclose radius and density of primary gas supply holes constant over entire surface where any holes exist and that the number of circulating holes being higher than the primary supply holes.

Umotoy et al disclose a supply system for two independent gases (Fig 1-116,118) where gases enter the processing chamber through a showerhead so that the holes are inter spread and both primary and secondary holes density and radius are constant over entire surface (Fig 1-148) and disclose buffer space above primary and circulating holes (Fig 1-144 and 136).

Moslehi et al teach a programmable multizone gas injector where injector parameters could be varied in any number of ways (Abstract, Fig 1 and Col 7 lines 22-29). Thus the number of holes or the area of holes, in a zone could be made higher or lower compared to another zone depending upon process requirement.

Therefore it would have been obvious for one of ordinary skill in the art at the time invention was made to replace the shower head of Kurihara with the one of Umotoy et al with higher circulating gas holes, so as to make both primary and circulating gases flow evenly on the substrate with required circulating gas with higher conductance.

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Regarding claims 3 and 4 adjustments of conductance in order to achieve target flow without increasing back-pressure would be an intended use and would be obviously needed to maintain the integrity of the vacuum system. This concept has been taught in Kurihara (Para 12 and other places in the document) also.

Claims 6, 10, 11, 22 and 23 are directed to an intended use and do not structurally define any thing over Kurihara.

Regarding claim 14 Umotoy discloses primary gas holes around circulating and circulating holes around primary.

Regarding claim 26, the limitation of setting the flow rate to 80% is an intended use of the apparatus. The conductance adjustment valves however allow setting this ratio.

#### ***Response to Amendment***

Applicants arguments filed 12/08/2003 have been considered but not found to be persuasive.

Applicant has argued that no motivation exists for the combination of Umotoy and Moslehi with Kurihara.

Examiner disagrees.

Kurihara discloses circulating a part of exhaust gas back to the process chamber for the reason of conservation and shows this in a simple schematic (Fig 5) without expressly disclosing the details about spacing of distribution holes. Umotoy discloses the holes spaced for even distribution (Fig 1) and Moslehi teaches that parameters relating to distribution of more than one gas are basically driven by process requirements (Abstract and Col 7 lines 23-29). The apparatus disclosed by Kurihara is designed to process semiconductor wafers and it would be obvious to

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one of ordinary skill in the art to make sure that the gases are distributed evenly on the face of the substrate. Doing any other way would reduce process uniformity and not serve the basic purpose of processing.

The number of circulating holes are related to the conductance and the flow of circulating gas and are therefore driven by the process requirement as taught by Moslehi. Modifications like this are considered to be normal optimization and would be obvious to one of ordinary skill in the art.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK

  
GREGORY MILLS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700